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WHAT IS CLAIMED IS:

1. A process for cracking an olefin-rich hydrocarbon feedstock which is selective towards light olefins in the effluent, the process comprising contacting a hydrocarbon feedstock containing olefins having a first composition of one or more olefinic components with a crystalline silicate catalyst to produce an effluent having a second composition of one or more olefinic components, the feedstock and the effluent having substantially the same olefin content by weight therein, the feedstock contacting the catalyst in the presence of hydrogen for enhancing the stability of the catalyst.

2. A process according to claim 1 wherein the hydrogen partial pressure is up to 7.5 bar.

3. A process according to claim 2 wherein the hydrogen partial pressure is from 0.1 to 5 bar.

4. A process according to claim 1 wherein the hydrogen is added to the feedstock prior to contact with the catalyst.

5. A process according to claim 1 wherein at least a part of the hydrogen is recycled from the effluent.

6. A process according to claim 1 wherein ethylene has been added to a C₄+ hydrocarbon feedstock.

7. A process according to claim 6 wherein at least a part of the ethylene is recycled from the effluent.

8. A process according to claim 6 wherein the ethylene comprises from 0.1 to 50wt% of the hydrocarbon feedstock.

9. A process according to claim 6 further comprising recycling at least a part of C₅ or greater olefins from the effluent to the feedstock.

10. A process according to claim 1 wherein the catalyst comprises silicalite.

11. A process according to claim 1 wherein the catalyst has a silicon/aluminium atomic ratio of at least 180.

12. A process according to claim 1 wherein the feedstock comprises a light cracked naphtha.

13. A process according to claim 1 wherein the feedstock comprises a C₄ cut from a fluidised-bed catalytic cracking unit in a refinery, or a C₄ cut from a unit in a refinery for producing methyl tert-butyl ether or a C₄ cut from a steam-cracking unit.

14. A process according to claim 1 wherein the catalytic cracking has a propylene yield on an olefin basis of from 30 to 50% based on the olefin content of the feedstock.

15. A process according to claim 1 wherein the olefin contents by weight of the feedstock and of the effluent are within $\pm 15\%$ of each other.

16. A process according to claim 1 wherein the feedstock contacts the catalyst at an inlet temperature of from 500 to 600°C.

17. A process according to claim 16 wherein the inlet temperature is from 540 to 580°C.

18. A process according to claim 1 wherein the feedstock contacts the catalyst at an olefin partial pressure of from 0.1 to 2 bar.

19. A process according to claim 18 wherein the olefin partial pressure is around atmospheric pressure.

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20. A process according to claim 1 wherein the feedstock is passed over the catalyst at an LHSV of from 10 to 30h^{-1} .

21. A process according to claim 1 wherein the feedstock has a maximum diene concentration therein of 0.1wt%.